REMARKS

Claims 1 through 77 are pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1 through 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Proksch et al. (U.S. Pat. No. 4,498,646) in view of Gleine et al. (U.S. Pat. No. 5,875,998). This rejection is respectfully traversed.

Proksch and Gleine do not disclose, teach or suggest each and every feature of the rejected claims. For example, neither Proksch nor Gleine, alone or in combination, disclose, teach or suggest a wing having a transonic cruise slot.

Proksch relates to profile designs of general-aviation airfoils for short take-off and landing (STOL) aircraft with cruising speeds up to 700 kilometers/per hour, which is below the transonic regime. Therefore, the Proksch two-dimensional airfoils are not transonic airfoils, and, accordingly, any slots that Proksch teaches are irrelevant to the invention as claimed in claims 1-77. In addition, the "slot forming flap" in Proksch is a conventional high-lift flap which does not form a slot during cruise. Thus, Proksch also does not disclose a cruise slot. Further, Proksch does not go beyond the two-dimensional aspects of an airfoil. For example, Proksch does not specifically address the three-dimensional shape of the slot or the airfoil.

Gleine describes improving cruise performance of a wing and controlling shock-induced separation, but accomplishes this improvement solely by changing the camber (the shape) of the airfoil/wing through flap movement. Gleine expressly teaches that its high-lift slot should be closed during cruise, and, accordingly, Gleine teaches away from the present invention. For example, in Fig. 9, Gleine illustrates a wing in the cruise condition. The wing lacks an open slot to divert air in the manner that Applicants describe and claim their invention. At column 9, lines 1 - 3, Gleine says: "FIG. 9 shows a Cp diagram with the corresponding wing section for a certain flight condition, for example for cruise flight at a certain altitude and at a certain speed." Accordingly, Gleine fails to teach or to suggest a wing or airfoil having a transonic cruise slot, especially one that allows a portion of air flowing along the lower surface of the leading airfoil element to diverge during cruise to flow over the upper surface of the trailing airfoil element. See MPEP 2145 ("It is improper to combine references where the references teach away from their combination.")

Even if it is proper to combine Proksch and Gleine, the combined patents still fail to disclose, teach or suggest each and every feature of the rejected claims, such as a transonic cruise slot. For at least the above reasons, the Patent Office is respectfully requested to reconsider and withdraw the section 103 rejections of claims 1 through 77.

With regard to dependent claims 2-21, 23-42, 44-50, 52-59, 61-68, and 70-77, these claims each depends from a claim shown above to be allowable. Accordingly, Applicants respectfully submit that claims 2-21, 23-42, 44-50, 52-59, 61-68, and 70-77 are allowable for at least the reasons given above in connection with the independent claim from which it depends.

In addition, the dependent claims are further patentably distinguishable over Proksch in view of Gleine because these patents do not disclose, teach or suggest the additional features required by the dependent claims, such as:

> "the cruise slot extends spanwise along an outboard portion of the wing, the cruise slot extending spanwise outboard of an inboard portion of the wing that includes a traditional trailing edge high-lift system" (as recited in claim 5); or
>
> "the cruise slot extends spanwise from about a planform break of the wing to about a tip of the wing" (as recited in claims 6 and 26); or
>
> "the cruise slot only extends over a portion of the wing where airflow separation would occur to add drag during a transonic condition of the wing" (as recited in claims 7 and 27); or
>
> "the cruise slot extends spanwise essentially continuously from a root of the wing to a tip of the wing" (as recited in claim 8); or
>
> "the cruise slot includes a single slot that extends substantially the entire length of the span of the wing from about a root of the wing to about a tip of the wing" (as recited in claims 49 and 56); or

> "slot location substantially coincides with shock location" (as recited in claims 62 and 64); or
>
> "the cruise slot is located along the span only at the position where the airfoil experiences Mach critical flow" (as recited in claims 63 and 65); or
>
> "the tailoring includes locating the slot substantially coincident with shock location" (as recited in claim 70); or
>
> "obtaining the three-dimensional wing pressure distribution data by computational modeling" (as recited in claim 71); or
>
> "obtaining the three-dimensional wing pressure distribution data by simulating an airflow over the wing using three-dimensional computational fluid dynamics" (as recited in claim 72); or
>
> "the tailoring includes locating the slot where the three-dimensional computational fluid dynamics simulated airflow suggests that a pressure field will result in airflow separation on the upper surface of the wing" (as recited in claim 73); or
>
> "determining where the wing will become Mach number critical, and wherein the tailoring includes locating the slot only where it has been determined that the wing will become Mach number critical" (as recited in claim 74) or
>
> "the airfoil has a pressure distribution as shown in one of Figures 16B, 17, 19A, and 19B" (as recited in claim 77).

As mentioned above, Proksch relates to profile design of general-aviation airfoils for STOL aircraft with cruising speeds up to about 700 kilometers/per hour, which is below the transonic regime. Therefore, the Proksch two-dimensional airfoils are not transonic airfoils, and, accordingly, any slots that Proksch teaches are irrelevant to the transonic cruise slot required by the claims. In addition, the "slot forming flap" in Proksch is a conventional high-lift flap which does not form a slot during cruise. Accordingly, Proksch fails to disclose, teach or suggest a cruise slot, especially one that is outboard of a traditional trailing edge high-lift system. Proksch also does not go beyond the two-dimensional aspects of airfoil design, and provides no suggestion that the slot should extend spanwise at the locations recited in claims 5-8, 26, 27, 49, 56, 62, 63, 65, 66, 70, 73, and 74.

Gleine expressly teaches that its high-lift slot should be closed during cruise, and, accordingly, Gleine teaches away from a transonic cruise slot as required by the claims. See, for example, FIG. 9 and column 9, lines 1-3. Further, Gleine does not disclose a transonic cruise slot outboard of the inboard high-lift devices (as recited in claim 5) because Gleine uses the inboard high-lift devices (e.g., landing flap 25) to form the slot. See, for example, FIG. 8 illustrating a slot formed by landing flap 25. The landing flaps 25 used to form the slot are inboard, and accordingly, any slots that Gleine teaches do not extend spanwise to about a tip of the wing, as recited in claims 6, 8, 26, 49, and 56.

Finally, Lotz (U.S. Patent No. 4,856,735) forms the slot using a high lift flap. See, for example, column 5, lines 33-35: "The gap can be formed both by an adjustable covering to seal and clear the gap and by a correspondingly adjustable high lift flap." Lotz also does not go beyond the two-dimensional aspects of an airfoil, and provides no suggestion that the slot should extend spanwise outboard of the inboard high-lift system, as recited by claim 5. While Lotz appears to suggest locating the slot behind the shock, Lotz does not teach or suggest that the slot should extend spanwise at the particular locations recited in claims 5-8, 26, 27, 49, 56, 62, 63, 65, 66, 70, 73, and 74.

REJECTION UNDER 35 U.S.C. § 112

Claim 77 stands rejected under 35 U.S.C. § 112 as being indefinite in that it fails to point out what is included or excluded by the claim language and for being an omnibus type claim referring to the figures. This rejection is respectfully traversed.

Applicants respectfully submit that claim 77 is sufficiently definite as to permit those skilled in the art to readily understand the scope of claim 77. Further, Applicants undersigned attorney performed a patent search on February 1, 2005 at the USPTO website (www.uspto.gov) that located issued U.S. patents having claims that refer to the figures. See, for example, U.S. Patent No. 6,005,428 (claim 5), U.S. Patent No. 4,625,720 (claims 17 and 18), and U.S. Patent No. 5,738,030 (claim 14). This notwithstanding, and for purposed of expediting prosecution, Applicants have amended claim 77 to recite Figures 16B, 17, 19A, and 19B. Accordingly, Applicants respectfully request withdrawal of the Section 112 rejection of claim 77.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (314) 726-7502.

Respectfully submitted,

Dated: February 3, 2005

By: ______________________
Anthony Fussner, Reg. No. 47,582

HARNESS, DICKEY & PIERCE, P.L.C.
7700 Bonhomme, Suite 400
St. Louis, Missouri 63105
(314) 726-7500